

IN THE DRAWINGS:

Enclosed herein is a replacement sheet of a formal drawing for Figure 16, wherein a "Prior Art" legend has been added.

REMARKS

Claims 1-17 are pending. By this Amendment, Claims 1 and 9 are amended for cosmetic purposes only and not for any reason related to patentability. Applicants respectfully submit no new material is presented herein.

Allowed/Allowable Claims

Applicants respectfully acknowledge and appreciate the indication by the Examiner that Claims 2-4, 7-8, and 12-17, although objected to for being dependent upon a rejected base claim, would be allowable if rewritten in independent form, including all of the features of the base claim and any intervening claims.

Drawing Objections

The drawings are objected to, because drawing Figure 16 does not include a legend, such as "Prior Art," because only that which is old is illustrated. A replacement drawing sheet for Drawing Figure 16 is included herein, wherein a "Prior Art" legend is included, responsive to the objection.

In view of the above, Applicants respectfully request withdrawal of the objection.

Claims Rejected—35 U.S.C. § 103

Claims 1, 5, 6, and 9-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,810,768 to Comfort et al. ("Comfort") in view of U.S. Patent No. 6,571,135 to Bergold et al. ("Bergold"). Applicants respectfully traverse the rejection.

Claim 1 recites an actuator control apparatus, relating to a control object having a plurality of state values changed according to an action of an actuator, including first state value ascertaining means, which ascertains a first state value which changes

according to the action of an actuator; second state value ascertaining means, which ascertains a second state value different from the first state value which changes according to the action of the actuator; and operation amount determining means, which uses a first response specifying control capable of variably specifying the attenuation behavior and attenuation speed of a deviation of the first state value from a first target value such that said first state value matches the first target value, taking at least the deviation as a first state amount, to determine a first operation amount to drive said actuator such that the first state amount is made to converge on an equilibrium point on a first switching function stipulated by a first linear function which takes as a variable the first state amount, and which determines the response characteristic of said first response specifying control such that said second state value matches a second target value.

Claim 9 recites an actuator control apparatus, including first state value ascertaining means, which ascertains a first state value which changes according to the action of an actuator; second state value ascertaining means, which ascertains a second state value differing from the first state value which changes according to the action of the actuator; and operation amount determining means, which uses response specifying control capable of variably specifying the attenuation behavior and attenuation speed of a deviation of the first state value and a first target value such that said first state value matches the first target value, to determine the operation amount to drive said actuator such that the value of a switching function stipulated by a linear function is made based at least on the deviation to converge on zero, and in addition performs switching, according to said first state value or to said second state value, to

set the response characteristic of said response specifying control either according to said first state value, or such that said second state value matches a second target value.

Comfort discloses a compliant link (300) disposed between a shift actuator (115) and a selector member (110). The compliant link (300) includes first and second members (302) and (304) and a connecting rod (312) slidable within bores (308) of the first and second members (302), (304). The connecting rod (312) is biased within the bores (308) via springs (320) and (330).

Bergold discloses a control unit having PI controllers (10) and (11) and decoupling members (12) and (13). The controllers (10), (11) each receive a control variable (x_1 and x_2 , respectively) and a reference magnitude (w_1 and w_2 , respectively). The controllers (10), (11) output a signal "u" to the decoupling members (12), (13), which automatically perform transfer functions k_{21} and k_{12} on the "u" signal. The decoupling members (12), (13) then output correcting quantities (14) and (15), respectively, to a "d" input of the controllers (10), (11) as well as to subtracting elements (16) and (17). The subtracting elements (16) and (17) subtract the correcting quantities (14) and (15) from corrected outputs y_1 and y_2 outputted from the controllers (10) and (11). The resultant values are then inputted back into the decoupling members (12), (13) at input "u".

Further, the control variables (x_1) and (x_2) of the Bergold control unit quickly respond to sign changes in the corresponding control deviation at the input of the controller. The Bergold control unit achieves this quick response by eliminating so-called integrator wind-up, which allows the control unit to perform a sign change of the

manipulated variable *immediately* after a sign change in the control deviation. Integrator wind-up is the runaway of the integrator of a PI or PID controller when the manipulated variable is at its limits. Bergold is able to eliminate integrator wind-up by holding the input of the cross controller (*i.e.*, decoupling members (12), (13)) when the control variable limit is reached. See Bergold at column 2, line 61 through column 3, line 9.

However, Comfort and Bergold, either alone or in combination, do not teach or suggest each and every feature recited in Claims 1 and 9. In order to establish *prima facie* obviousness, all claim features must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981 (CCPA 1974) and M.P.E.P. § 2143.03.

The Office Action **admits** that that Comfort teaches only a mechanical system that does not use a feedback control to manipulate a device. Comfort merely teaches the mechanical compliant link (300), described above. Further, the Office Action does not cite any portion of Comfort for teaching or suggesting **any** feature recited in Claims 1 and 9. Because Comfort teaches only a mechanical system that completely lacks any actuator control apparatus and because the inventions of Claims 1 and 9 are directed to an actuator control apparatus, Comfort does not teach or suggest **any** feature recited in Claims 1 and 9. Particularly, Comfort does not teach or suggest a first state value ascertaining means, which ascertains a first state value which changes according to the action of an actuator or a second state value ascertaining means, which ascertains a second state value different from the first state value which changes according to the action of the actuator.

Further, the purpose of the compliant link (300) of Comfort is merely to reduce an impact force applied to the synchromesh mechanism when a synchronizer is engaged in order to avoid damage to the synchromesh mechanism and the generation of noises and jerks in the driveline. Conversely, the present invention **controls** application of a pressing force during contact of a coupling sleeve and a synchronizer ring via an actuator control apparatus. As explained above, Comfort does not teach or suggest any type of actuator control apparatus.

Similarly, Bergold also does not teach or suggest a first or second state value ascertaining means. The Office Action does not cite, and, indeed, Bergold does not teach or suggest, **any** feature corresponding to a first state value ascertaining means, which ascertains a first state value which changes according to the action of an actuator or a second state value ascertaining means, which ascertains a second state value different from the first state value which changes according to the action of the actuator. Bergold merely teaches PI controllers (10) and (11) that generate manipulated variables y_1 and y_2 and decoupling members (12) and (13) which are used to decouple a 2x2 multivariable system in a known manner. See col. 4, lines 41-65 of Bergold.

Additionally, Bergold does not teach or suggest a first state amount that is made to converge on an equilibrium point on a first switching function stipulated by a first linear function which takes as a variable the first state amount, as recited in Claim 1, or the value of a switching function stipulated by a linear function that is made based at least on the deviation to converge on zero, as recited in Claim 9. These features are otherwise referred to as sliding mode control. On the contrary, Bergold teaches a controller that utilizes PID (Proportional, Integral, Derivative) control, as stated in

column 7, line 27 through column 2, line 63 of Bergold. As such, Bergold does not teach or suggest each and every feature recited in Claims 1 and 9. Hence, these features that are recited in Claims 1 and 9 are completely absent from Bergold.

Also, Applicants request that any future communication from the Office maintaining the instant rejection include a precise citation identifying the portion(s) of both Comfort and Bergold teaching and/or suggesting each feature recited in the rejected claims. Applicants have exhaustingly reviewed both Comfort and Bergold and have been unable to identify therein **any** feature recited in the rejected claims.

The Office Action also asserts that Comfort is the U.S. equivalent of Japanese Patent Laid-Open No. 2002-195406 ("JP '406") mentioned on page 3 of the Specification. However, the Office Action provides no factual basis in support of this assertion. Further, even if Comfort is the equivalent of the JP '406, Comfort suffers from the same problems as JP '406. That is, Comfort is unable to control a pressing force to reliably match a preset target level in order to prevent a coupling sleeve from rebounding when the coupling sleeve makes contact with a synchronizer or to prevent the coupling sleeve from damaging the synchronizer when the coupling sleeve is pressed with excessive force. Moreover, the Office Action does not explain how combining the teachings of Bergold with Comfort overcomes these problems, nor does the Office Action cite any portion of Bergold whatsoever that could be incorporated into the teachings of Comfort to overcome the problems described above. Accordingly, the rejection of Claims 1, 5, 6, and 9-11, for at least these reasons, is inadequate and improper, because the Office Action has failed to establish any factually supported basis as required by M.P.E.P. § 2142.

Additionally, contrary to the Office Action's assertion, Comfort and Bergold are not from the same field of endeavor. Comfort teaches a compliant link positioned between an actuator and a selector member (110) to restrict the forces applied to a synchromesh mechanisms in order to avoid damage thereto and the generation of noises and jerks in the drive line. See col. 6, lines 61-65 of Comfort. On the other hand, Bergold teaches a control unit for controlling a system with several coupled control variables. Therefore, Comfort and Bergold are not from the same field of endeavor, because they relate to two completely different fields of technology. As such, the two references are not analogous.

According to M.P.E.P. § 2141.01(a), in order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field the applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concern. Further, "[a] reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem." *Wang Laboratories Inc. v. Toshiba Corp.*, 993 F.2d 858 (Fed Cir. 1993).

Here, the Office Action has failed to establish the necessary nexus between Bergold and Comfort and the problem to be solved by the invention of Claims 1 and 9, that is, an actuator control apparatus capable of reliably matching a state value which changes according to the action of an actuator, with a prescribed target value. Further, neither Bergold or Comfort relate to a control apparatus which suppresses instability in actuator behavior when switching the type of state value to be controlled.

Additionally, not only are the references not analogous, there is no motivation to combine the teachings of Comfort and Bergold. To establish *prima facie* obviousness there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. M.P.E.P. § 2141. Further, the Patent and Trademark Office ("PTO") bears the initial burden to provide some suggestion of the desirability of doing what the inventor has done. *Id.* The references must expressly or impliedly suggest the claimed invention or the PTO must present a convincing line of reasoning as to why the artisans would have found the claimed invention to have been obvious in light of the teachings of the references. *Id.* Moreover, the level of skill in the art cannot be relied upon to provide the suggestion to combine references. M.P.E.P. § 2143.01.

Here, the Office Action fails to cite **any** motivation or suggestion to combine the teachings of Comfort and Bergold whatsoever. The Office Action merely asserts that it would have been obvious to combine the teachings of Comfort and Bergold simply because the two references are assertedly related to the same field of endeavor. As explained above, this is not the case. Moreover, the Office Action does **not** cite any portion of Comfort or Bergold for expressly or impliedly supplying the motivation to combine the two references, nor has the Office Action provided a convincing line of reasoning as to why an artisan of ordinary skill in the art would have found the claims to be obvious in light of the teachings of Comfort and Bergold. Therefore, the Office Action has failed to provide a valid motivation or suggestion to combine the teachings of

the cited references. Therefore, the Office Action has failed to establish *prima facie* obviousness.

Consequently, because neither Comfort nor Bergold, either alone or in combination, teach or suggest each and every feature recited in Claims 1 and 9, because Comfort and Bergold are not related to the same field of endeavor as Applicant's invention, and because there is no motivation to combine the cited art references, the Office Action has failed to establish *prima facie* obviousness. Accordingly, Applicants respectfully submit Claims 1 and 9 should be deemed allowable.

Claims 5-6 depend from Claim 1, and Claims 10-11 depend from Claim 9. Therefore, Applicants respectfully submit that Claims 5-6 and 10-11 are should be allowable for at least the same reasons Claims 1 and 9 are allowable, as well as for the additional subject matter recited therein.

Accordingly, Applicants respectfully request withdrawal of the rejection.

Conclusion

In view of the foregoing, reconsideration of the application, withdrawal of the outstanding objections and rejections, allowance of Claims 1-17, and the prompt issuance of a Notice of Allowability are respectfully solicited.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing docket number 101175-00044**.

Respectfully submitted,
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Enclosure: Replacement Drawing Sheet for Drawing Figure 16
Petition for Extension of Time

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